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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
OLEG STENZEL, ET AL. : EXAMINER: HANOR, SERENA L.
SERIAL NO: 10/523,029 :
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PRECIPITATED SILICA :

DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

I, André Wehmeier, declare and state as follows:

1. I am a graduate of FH Muenster and received my diploma degree in the year of 1998. I have been employed by
Evonik Degussa GmbH for 10 years as a chemical
graduated engineer in the field of product development
silica.
2. I am familiar with the claims, and have read the Office Action mailed April 18,
2008, in the above-identified application.

3. The following experiments, named Example A, were conducted under my supervision and/or control. In Example A, precipitated silicas according to Examples 4 and 5

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of U.S. Patent 6,180,876 (Uhrlandt et al) were compared to precipitated silicas according to Example 1 of the specification of the above-identified application.

4. General performance standard operating procedure (SOP):

The inventive silica according to Example 1 of the above-identified application was tested in a typical motor-truck tire compound. Moreover, this formula is also relevant for the carcass of all rubber tires.

The formula used for the rubber mixtures is specified in the following Table A. The unit "phr" therein denotes parts by weight relative to 100 parts of the raw rubber used.

Table A: Compound

Formula	Article designation	phr	Substance	Company
1 st step	Basic mixing			
SMR 10 (degraded to ML4 = 60 to 70)	100	Natural rubber		
CORAX N 121	20	Carbon black		Degussa AG; Frankfurt am Main; Germany
Silica (KS)	20			
Si 69	2.0	Si 69 (bis(3-triethoxysilylpropyl)tetrasulfide)		Degussa AG; Frankfurt am Main; Germany
EDENOR ST1 GS	3.0	Palmitic-stearic acid; "iodine number 1" stearin		Caldic Deutschland GmbH & Co. KG; 40231 Düsseldorf; Germany
ZnO; RS RAL 844 C	3.0	ZnO		Arnsperger Chemikalien GmbH; 50838 Cologne; Germany
Vulkanox 4020 / LG	2.0	N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD)		Rhein Chemie Rheinau GmbH; 68219 Mannheim Rheinau; Germany
Vulkanox HS / LG	0.5	Trimethyldihydroquinoline		Rhein Chemie Rheinau GmbH; 68219 Mannheim Rheinau; Germany
Naftolen ZD	10.0	Aromatic plasticizer oil		Chemetall GmbH; 60487 Frankfurt a. Main; Germany
2 nd step	Lasting / remill step			
Step 1 batch				
CORAX N 121	10	Carbon black		Degussa AG; Frankfurt am Main; Germany
3 rd step	Finish mixing			
Step 2 batch				
Rhenogran TBBS-80	1.7	80% polymer bound of butylbenzothiazole sulfonamide (TBBS)		Rhein Chemie Rheinau GmbH; 68219 Mannheim Rheinau; Germany
Vulkacit DZ/EG-C	0.3	Dicyclohexylbenzothiazole sulfonamide (DCBS)		Rhein Chemie Rheinau GmbH; 68219 Mannheim Rheinau; Germany
Ground sulfur	1.4	Finely divided sulfur according to Ph Eur, DP		Merck KGaA; 64271 Darmstadt; Germany

5. The general method for manufacture of rubber mixtures and their vulcanized derivatives is described in the following book: "Rubber Technology Handbook", W. Hofmann, Hanser Verlag 1994. The specific mixing conditions for the various compounds are presented in Table B.

Table B: Mixing SOP

Mixing SOP	
1st step	W&P GK 1.5E kneader, filling level 0.56, 80 rpm, flow temperature 90 °C, plunger pressure 5.5 bar
0.0 to 1.0 minutes 1.0 to 2.0 minutes 2.0 to 3.0 minutes 3.0 to 3.0 minutes 3.0 to 5.0 minutes 5.0 minutes	Polymers Carbon black; ZnO; stearic acid, Naftolen Silica & silane; other constituents of the 1 st step Clean Mix, with speed variation if necessary, in order to reach the ejection temperature Discharge batch (batch temperature 140 °C to 150 °C) and distribute on roll: Cut in and fold over 3 x on left, 3 x on right, turn over 3 x for narrow roll nip, 3 x for broad roll nip Draw out a rolled sheet
24 hours intermediate storage at room temperature to step 2	
2nd step	W&P GK 1.5E kneader, filling level 0.55, 80 rpm, flow temperature 80 °C, plunger pressure 5.5 bar
0.0 to 1.0 minutes 1.0 to 2.0 minutes 2.0 minutes 2.0 to 4.0 minutes 4.0 minutes	Plasticize batch from step 1 Carbon black Aerate, clean Maintain batch temperature at 145 ° by speed variation Discharge batch (batch temperature 145 °C to 155 °C) and distribute on roll: Cut in and fold over 3 x on left, 3 x on right, turn over 3 x for narrow roll nip, 3 x for broad roll nip Draw out a rolled sheet
4 hours intermediate storage at room temperature to step 3	
3rd step	W&P GK 1.5E kneader, filling level 0.53, 40 rpm, flow temperature 50 °C, plunger pressure 5.5 bar
0.0 to 2.0 minutes 2.0 minutes	Batch from step 2, accelerator, sulfur Discharge batch (batch temperature 90 °C to 110 °C) and distribute on roll: Cut in and fold over 3 x on left, 3 x on right, turn over 3 x for narrow roll nip, 3 x for broad roll nip Draw out a rolled sheet
12 hours intermediate storage at room temperature until beginning of the tests	

6. Technological rubber testing takes place according to the test methods presented in

Table C.

Table C: Test methods

Physical testing	Standard / Conditions
ML 1+4, 100 °C, 3 rd step (ME)	DIN 53523/3 ISO 667
Mooney scorch, 130 °C	DIN 53523/3 ISO 667
Scorch time t_5 (minutes)	
Scorch time t_{35} (minutes)	
Tensile test on standard bar S 1, 23 °C	DIN 53504, ISO 37
Tensile test (MPa)	
Elongation at break (%)	
DIE C N/mm)	ASTM D 624
Shore A hardness, 23 °C (SH)	DIN 53 505
Viscoelastic properties	DIN 53 513, ISO 2856 50 N preliminary force and 25 N amplitude force, temperature-stabilization time 5 minutes; recording of measured values after 30 s test time
Complex modulus E^* (MPa)	
Loss factor $\tan \delta$ (-)	

7. Table D below presents the application-related data of the mixtures compounded and tested according to Tables A to C.

Table D: Results

		Example 4 Uhrlandt et al	Example 5 Uhrlandt et al	Example 1 of present invention
ML 1+4, 100 °C, 3 rd step	ME	37	39	39
Mooney scorch 130 °C; small rotor				
Scorch time t_5	min	17.9	18.1	19.9
Scorch time t_{35}	min	22.2	22.7	23.9
Vulcanization time; 150 °C	min	18	18	18
Tensile strength	MPa	22.7	22.3	22.7
Elongation at break	%	577	563	577
Die C; 100 °C	N/mm	52	55	75
Shore A hardness	SH	56	55	55
Viscoelastic properties				
E^* , 0 °C	MPa	8.0	7.9	8.1
E^* , 60 °C	MPa	5.6	5.6	5.6
$\tan \delta$, 0 °C	-	0.234	0.234	0.234
$\tan \delta$, 60 °C	-	0.132	0.137	0.139

8. The compound containing the silica according to Example 1 of the present invention exhibits a very balanced profile of rubber values; among the properties of the raw mixture, the improved processing safety stands out in particular, as indicated by the prolonged scorch times. Whereas the reinforcement properties and also the viscoelastic properties correspond to the reference level or are slightly improved at comparable Shore A hardness, a distinct increase of high-temperature tearing resistance in the ASTM D 624 test (Die C) can be observed. This performance improvement by 36% and 44% respectively is an important criterion above all for high-performance, SUV and motor-truck tires.


9. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

10. Further declarant saith not.

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Signature

27.05.2008
Date